

**[CLAIMS]****【Claim 1】**

A method of forming a porous coating layer on mother material, comprising:

5 providing the mother material;

feeding powder having a metal composition, which includes at least two different metals selected from the group consisting of Al, Mg, Zn, and Sn and which is expressed by  $xA-(1-x)B$  ( $0 < x < 1$ , x is a weight ratio of A and 10 B), onto the mother material;

supplying high pressure gas to the powder;

applying the metal powder on the mother material by spraying the metal powder using the high pressure gas through an supersonic nozzle; and

15 heat-treating the coated mother material to form the porous coating layer.

**【Claim 2】**

The method as set forth in claim 1, wherein the powder having the metal composition includes alloy powder 20 of at least two metals selected from the above group.

**【Claim 3】**

The method as set forth in claim 1, wherein A is Al, and B includes a metal element selected from the group consisting of Mg, Zn, and Sn.

**【Claim 4】**

The method as set forth in claim 1, wherein the supplying of the high pressure gas comprises:  
compressing gas; and  
5 pre-heating the compressed gas.

**【Claim 5】**

The method as set forth in claim 1, wherein the heat-treatment of the coated mother material is conducted at a temperature between a eutectic temperature of A and B and a 10 melting point of a metal having the higher melting point of A and B.

**【Claim 6】**

The method as set forth in claim 1, wherein the heat-treatment of the coated mother material is conducted at 15 about 200 - 650°C.

**【Claim 7】**

The method as set forth in claim 1, wherein the feeding of the powder further comprises changing x to change the composition of the powder.

**20 【Claim 8】**

The method as set forth in claim 1, wherein the gas

includes any one selected from the group consisting of helium, nitrogen, argon, and air.

**【Claim 9】**

A metal coated member, comprising:  
5           metal mother material; and  
              a coating layer formed on the metal mother material,  
which includes at least two metal elements and is expressed  
by  $xA-(1-x)B$  ( $x$  is a weight ratio of A and B),  
              wherein, A and B are different metals selected from  
10      the group consisting of Al, Mg, Zn, and Sn,  $x$  changes when  
moving in a thickness direction of the coating layer within  
a range of  $0 < x < 1$ , and porosity of the coating layer is  
changed depending on a change in  $x$ .

**【Claim 10】**

15      The metal coated member as set forth in claim 9,  
wherein  $x$  increases or decreases moving in a thickness  
direction of the coating layer, and the porosity of the  
coating layer is increased or decreased as  $x$  is increased  
or decreased.

20      **【Claim 11】**

The metal coated member as set forth in claim 10,  
wherein A is Al, B is any one metal selected from the group  
consisting of Mg, Zn, and Sn, and  $x$  is decreased and the

porosity of the coating layer is increased moving from an interface of the metal mother material and the coating layer to a surface of the coating layer.

**【Claim 12】**

5           A metal coated member, comprising:  
              metal mother material; and  
              a coating layer formed on the metal mother material,  
              which includes at least two metal elements and is expressed  
              by A-B,  
10          wherein, A and B are different metals selected from  
              the group consisting of Al, Mg, Zn, and Sn, A or B selected  
              from the above group changes when moving in a thickness  
              direction of the coating layer, and porosity of the coating  
              layer is changed depending on a change in A or B.

15          **【Claim 13】**

The metal coated member as set forth in claim 9 or 12, wherein the coating layer includes open pores which are at least partially interconnected with each other.

**【Claim 14】**

20          The metal coated member as set forth in claim 13,  
              wherein the open pores exist in an upper part of the  
              coating layer.

**【Claim 15】**

A method of forming a porous carbon coating layer on mother material, comprising:

5 providing the mother material;

feeding carbon powder which is conglomerated by an organic binder;

supplying high pressure gas to the carbon powder; and

applying the carbon powder on the mother material by spraying the carbon powder using the high pressure gas

10 through a supersonic nozzle.

**【Claim 16】**

The method as set forth in claim 15, further comprising burning out the organic binder at 400 - 500°C after the application of the carbon powder.